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Indian Standard

ELECTROTECHNICAL VOCABULARY

PART XLVIII RECORDING

Sec 1 Tape Recording

(Incorporating Amendment No. 1)

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PART XLVIII RECORDING

Sec 1 Tape Recording

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ELECTROTECHNICAL VOCABULARY

PART XLVIII RECORDING

Sec 1 Tape Recording

0. FOREWORD

0.1 This Indian Standard (Part XLVIII/Sec 1) was adopted by the Indian Standards Institution on 22 June 1978, after the draft finalized by the Basic Standards on Electronics and Telecommunication Sectional Committee in consultation with the Recording Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 Originally IS : 1885 (Part III/Sec 3)-1967* covered the terms relating to sound recording and reproduction and is now being superseded by this standard.

0.3 This edition 1.1 incorporates Amendment No. 1 (January 1985). Side bar indicates modification of the text as the result of incorporation of the amendment.

0.4 While preparing this standard, assistance has been derived from IEC Pub 50 (806)-1975 'International Electrotechnical vocabulary, Chapter 806: Recording and reproduction of sound and video' issued by International Electrotechnical Commission.

1. SCOPE

1.1 This standard (Part XLVIII/Sec 1) covers terms relating to magnetic recording and reproduction, both audio and video. This standard also covers terms relating to optical recording.

2. GENERAL TERMS

2.1 Terms Relating to Both Audio and Video

2.1.1 *Recording*

a) Action by which signals are suitably embodied in a material base,

b) Techniques whereby information is embodied in a material base with the aim of preserving them with a view to their subsequent reproduction, and

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*Electrotechnical vocabulary: Part III Acoustics, Sec 3 Sound recording and reproduction.

c) Material base for signals after embodiment and, through extension, the signals themselves after reproduction.

2.1.2 *Recording Medium* — Material suitable for recording signals.

2.1.3 *Recording System* — Apparatus whereby the state or configuration of a suitable recording medium can be changed in conformity with signals, in such a way that these signals can be reproduced.

2.1.4 *Recording Channel* — A transmission channel for the purpose of carrying the signal to be recorded from a signal source to the recording medium. A recording system may have several channels.

2.1.5 *Recording Chain* — A chain for transmission of signals from the input of the system to and including the recording medium.

2.1.6 *Reproduction* (*Playback or Replay*) — The regeneration of recorded signals in their original form.

2.1.7 *Reproducing System* — Equipment for recreating signals embodied in a recording medium.

2.1.8 *Reproducing Channel* — A transmission channel for the purpose of carrying the signal being reproduced from a recording medium to an output, this output then being considered as the signal source. Several channels may be included in a reproducing equipment.

2.1.9 *Reproducing Chain* — A chain for transmission of the signals from the recording medium to the output of the system.

2.1.10 *Frequency Response Equalization* — The effect of all frequency discriminative means employed in a transmission system to obain a desired overall frequency response.

2.1.11 *Equalization* — Modification of the amplitude/frequency response characteristics of a recording or reproducing system with the purpose of compensating for deficiencies within the system.

2.1.12 *Pre-emphasis* (*Pre-equalization*) — The operation which consists in modifying the amplitude/frequency characteristic of the signal to be recorded.

2.1.13 *De-emphasis* (*Post-equalization*) — The operation which consists in restoring the original amplitude/frequency characteristic of the recorded signal on reproduction.

2.1.14 *Duplicating* (*Copying*) — An operation for simultaneously obtaining one or several examples of all or part of a recorded programme.

NOTE — This operation is normally carried out at a higher speed than that of the original recording.

2.1.15 *Re-recording* — An operation consisting in obtaining, by any method, on a recording medium all or part of a previously recorded programme.

2.1.16 *Dubbing*

a) The combination of two or more recordings into a composite recording by re-recording.

b) The recording so obtained.

2.1.17 *Ground Noise* — In recording and reproducing, the residual system noise in the absence of the signal. It is usually caused by inhomogeneity in the recording and reproducing media, but may also include amplifier noise.

2.1.18 *Transferring* — A copying by re-recording on a different medium.

2.1.19 *Master Record* — A recording, in edited or approved form, from which copies can be made.

2.2 Terms Relating to Audio

2.2.1 *Monophonic Recording* — Recording of audio-frequency signals via a single recording channel.

2.2.2 *Stereophonic Recording* — Recording of two signals from two recording channels, in such a way that after the reproducing process the information on each recording channel is separately available.

This process is intended to provide an impression of sound source location during reproduction.

2.2.3 *Monophonic Reproduction* — Reproduction of a single or multi-channel recording through a single channel.

2.2.4 *Stereophonic Reproduction* — Reproduction of a multi-channel recording through two channel.

2.2.5 *Multi-channel Recording* — A recording technique using several channels.

NOTE — For example: stereophony (two channels); quadrophony (four channels).

2.2.6 *Multi-channel Reproduction* — A reproducing technique using several channels.

NOTE — For example: stereophony (two channels); quadrophony (four channels).

2.2.7 *Monophonic Recording/Reproduction, Monophony* — Recording and reproducing techniques using one channel.

2.2.8 *Reference Level* — The magnitude of a significant parameter of a recorded medium. It is expressed in terms of recorded velocity in disk recording, and of short-circuit magnetic flux in magnetic recording.

NOTE — It enables relative recorded programme levels or relative noise levels to be defined.

2.2.9 *Recorded Level* — The magnitude of the signal level on a recorded medium defined by comparison with a reference level.

2.2.10 *Recording Level* — On a recording medium, the value of the recorded level for a stated percentage of distortion.

NOTE — It shall be stated whether this level is a measure of r. m. s., peak or peak-to-peak values.

2.2.11 *Recording Characteristic* — The variation, with respect to frequency, of the recorded level, when a signal of constant level and variable frequency is applied to the input of a recording system. In disk recording, the recording characteristic is defined in terms of velocity, in magnetic recording in terms of short-circuit flux.

2.2.12 *Recording Loss* — The attenuation, in a recording system, of the level of a recorded signal with respect to frequency.

NOTE — The loss may be due to different causes, for example, the finite dimensions of a cutting stylus.

2.2.13 *Ideal Transducer* — A transducer, the losses of which are negligible.

2.2.14 *Reproducing Characteristic* — The inverse of the recording characteristic. The variation, with respect to frequency of the output level of an ideal reproducing transducer, when reproducing a medium, recorded with a given recording characteristic. In disk recording, the reproducing characteristic is defined in terms of recorded velocity; in magnetic recording, in terms of short-circuit flux.

2.2.15 *Reproducing Loss* — The attenuation, with respect to frequency, of the output of a reproducing transducer when compared to the output of an ideal reproducing transducer.

NOTE — The reproducing loss may be due in disk recording to the finite dimensions of the reproducing stylus tip, or to groove wall deformations, and in magnetic recording to the magnetic head gap length and/or head core losses, during reproduction.

2.2.16 *Background Noise* — Unwanted signals present at the output of a transmission channel in the absence of the wanted signal, when the channel is in normal operation.

2.2.17 *Modulation Noise* — Unwanted signals generated by a wanted signal, excluding those due to harmonic and intermodulation products. Their characteristics are dependent upon the recording medium as well as the signal characteristic.

2.2.18 *Channel Separation* — The ratio, expressed in decibles, between two voltages occurring at the output terminals of a given channel *A*, namely U_A due to the wanted signal intended for channel *A*, and U'_B due to the unwanted signal produced by channel *B* in channel *A*.

2.2.19 *Cross-Talk* — The ratio, expressed in decibels, between two voltages occurring at the output terminals of channels *A* and *B*, namely U_A due to the wanted signal intended for channel *A*, and U'_A due to the unwanted signal produced by channel *A* in channel *B*.

2.2.20 *Channel Balancing* — The operation consisting in adjusting the parameters of a stereophonic system, in order to obtain identical characteristics in each channel.

2.2.21 *Channel Phasing* — The correct connection of stereophonic reproducing equipment so that signals applied in phase to the input of both channels are in phase at corresponding points in each channel.

2.2.22 *Speed Fluctuation* — A spurious frequency modulation in the recorded signal, in general caused by variation of the speed of the recording medium.

2.2.23 *Flutter* — An undesired form of frequency modulation introduced into the recorded signal by an irregular motion of the recording medium during the recording/reproducing process, the frequency of which is above 10 Hz.

2.2.24 *Wow* — An undesired form of frequency modulation introduced into the recorded signal by an irregular motion of the recording medium during the recording/reproducing process, the frequency of which is included between 0.1 Hz and 10 Hz.

2.2.25 *Drift* — An undesired slow variation of the speed of the recording medium during the recording/reproducing process.

2.2.26 *Mixing* — A process for combining several signals appearing simultaneously from several sources into a single signal.

2.2.27 *Deviation from Rated Speed* (*Tape Speed or Speed of Rotation*) — The relative deviation of the mean measured speed (tape speed or speed of rotation) with respect to the rated speed (tape speed or speed of rotation). It is expressed in percentage, regarded either as positive (+) when the measured speed is higher than the rated speed, or as negative (–) when it is lower. It is given by:

$$\frac{\text{Measured speed} - \text{Rated speed}}{\text{Rated speed}} \cdot 100 \text{ percent}$$

3. MAGNETIC RECORDING AND REPRODUCTION: BOTH AUDIO AND VIDEO

3.1 Magnetic Recording — A technique whereby the recording medium is magnetic.

3.2 Magnetic Recorder — An apparatus consisting of a recording medium transport system, recording heads, erasing heads, and associated electronic devices.

3.3 Magnetic Reproduction — A process of reproducing recorded signals from a magnetic medium.

3.4 Magnetic Reproducer — An apparatus consisting of a magnetic recording medium transport system, reproducing heads, and associated electronic devices.

3.5 Magnetic Head — An electromagnetic transducer for converting electrical signals into magnetic flux variations or *vice versa*.

3.5.1 *Magnetic Recording Head* — A magnetic head used to modify the magnetic state of a magnetic recording medium.

3.5.2 *Magnetic Reproducing Head* — A magnetic head used to recreate the signals recorded on a magnetic medium.

3.5.3 *Magnetic Recording/Reproducing Head* — A magnetic head able to be used alternatively as a recording head or as a reproducing head.

3.5.4 *Magnetic Erasing Head* — A magnetic head used to produce a magnetic field suitable for erasing a magnetic recording.

3.5.5 *Hall Effect Reproducing Head* — A reproducing head which uses semi-conductors sensitive to the Hall effect.

3.5.6 *DC Erasing Head* — A magnetic head which uses direct current to produce the magnetic field necessary for erasing.

3.5.7 *PM Erasing Head* — A magnetic head which used the fields of one or more permanent magnets for erasing.

3.5.8 *Double Pole Piece Magnetic Head* — A magnetic head having two separate pole pieces in which pole faces of opposite polarity are on opposite sides of the medium. One or both of these pole pieces may be provided with an energizing winding.

3.5.9 *Single Pole Piece Magnetic Head* — A magnetic head having a single pole piece on one side of the recording medium.

3.5.10 *Ring Head* — A magnetic head in which the magnetic material forms an enclosure with one or more air gaps. The magnetic recording medium bridges one of these gaps and is in contact with or in close proximity to the pole pieces on one side only.

3.6 Magnetic Recording Medium — A magnetic material used in conjunction with a magnetic recorder for retaining signals in the form of remanent magnetization.

NOTE — The material may be rigid or flexible in the form of tape, wire, disk, sheet, etc.

3.7 Magnetic Tape — A recording medium in the form of a ribbon, made of non-magnetic base, coated with a magnetizible material in a suitable binder.

3.7.1 *Magnetic Powder-Coated Tape* — A tape consisting of a coating of uniformly dispersed, powdered ferromagnetic material on a non-magnetic base.

3.7.2 *Magnetic Powder-Impregnated Tape* — A magnetic tape which consists of magnetic particles uniformly dispersed in a non-magnetic material.

3.8 Magnetic Wire — A magnetic recording medium in the form of wire which may be homogeneous or have a core of non-magnetic material.

3.8.1 *Magnetic Plated Wire* — A magnetic wire having a core of non-magnetic material and a plated surface of ferromagnetic material.

3.9 Blank Magnetic Tape — A tape which has never been magnetized.

3.10 Magnetic Stripe (on a Cinematograph Film) — A narrow band of magnetic material applied as a coating along the margin of a cinematograph film and which carries the sound record.

NOTE — The term is used to distinguish such a recording from stereophonic recording.

3.11 Magnetic Disk — A recording magnetic medium in the form of a disk.

3.12 Magnetic Track — The magnetized area traced out on a magnetic tape by a recording head.

3.13 Track Configuration — The location and dimensions of recorded magnetic tracks on the recording medium.

3.14 Magnetic Flux — The area integral of the magnetic flux density. Particularly the flux in the magnetic circuit of the heads.

3.15 Short-Circuit Flux of a Magnetic Tape — The flux which flows through the core of a reproducing head which has zero reluctance and in intimate contact with the surface of the tape over an infinite length.

NOTE — The value of the short-circuit flux is expressed in nanoweber per metre of tract width. In the case of a sinusoidal quantity, it should be indicated whether it is an r. m. s. or peak value.

3.16 Surface Induction — The flux density in free space normal to the surface of the magnetic medium.

3.17 Magnetic Head Core — A part of a magnetic head composed of a solid or laminated magnetic material forming the magnetic circuit of the head and carrying the coils.

3.18 Magnetic Head Gap — The gap between the two aligned faces of the pole pieces of a magnetic head, separated by a non-magnetic spacer.

3.19 Gap Width — The dimension of the magnetic gap parallel to the plane of the tape and perpendicular to the direction of the relative tape to head movement.

3.20 Gap Depth — The dimension of the magnetic gap perpendicular to the plane of the tape movement.

3.21 Gap Length — The actual distance between the pole pieces of a magnetic head.

3.22 Effective Gap Length — The numerical value which has to be substituted for the actual gap length for computing the gap loss. The effective gap length is determined by noting the longest recorded wavelength at which the head output is zero.

3.23 Gap Loss — A loss in output level due to the finite gap length of a reproducing head when the recorded wavelength approaches the gap length.

3.24 Erasure — A process by which a previous recording is removed from a magnetic medium.

3.25 Erasing Current — A direct or alternating current passing through the coils of an erasing head which produces a magnetic field used to erase signals recorded on a magnetic tape.

3.26 Saturation

a) The state of a ferromagnetic material subjected to an external magnetic field of such intensity that the induced magnetization cannot be substantially increased by further strengthening of that magnetic field.

b) (Deprecated in this sense) The state of remanent magnetization which results from having subjected a ferromagnetic material to such an external magnetic field. It is more accurately called ‘saturation remanence’.

3.27 Biasing — The conditioning of the magnetic medium during recording by superimposition of a high frequency or direct magnetic field upon that produced by the wanted signal.

NOTE — In video recording, an alternating bias is used for recording audio signals.

3.27.1 *AC Magnetic Biasing* — The magnetic biasing accomplished by use of an alternating current, usually well above the signal frequency range.

3.27.2 *DC Magnetic Biasing* — The magnetic biasing accomplished by the use of direct current.

3.28 Biasing Current — A direct or alternating current passing through the coils of a recording head which produces the biasing magnetic field.

3.29 Accidental Printing (**Spurious Printing**) (**Magnetic Printing**) — An undesired transfer of a recorded signal from one section to another of the recording medium when these sections are brought into proximity due to spooling on reel.

3.30 Hub — A circular device on which the magnetic tape is wound.

3.31 Flange — A fixed or removable circular disk forming one piece with the hub, on one or both sides of a hub for the purpose of protecting the magnetic tape wound on the hub.

3.32 Spool/Reel — A device composed of a hub and two circular flanges forming one piece with the hub on which a magnetic tape may be wound.

3.33 Supply Spool — A spool from which the magnetic tape is unwound during recording, reproduction, or a fast forward movement.

3.34 Take-Up Spool — A spool on which the magnetic tape is wound during recording, reproduction, or a fast forward movement.

3.35 Fast Forward Movement — An operation the purpose of which is to move the magnetic tape rapidly from the supply spool to the take-up spool without recording, reproduction or erasing.

3.36 Rewinding — An operation the purpose of which is to move the magnetic tape rapidly from the take-up spool to the supply spool.

3.37 Reel-to-Reel Recording/Reproducing Equipment — A device wherein a magnetic tape wound on a separate supply spool is unwound during recording, reproduction or a fast forward movement and simultaneously wound on to a separate empty take-up spool.

3.38 Cartridge — A device composed of a case containing a magnetic tape, in the form of a multiturn endless loop carried on a single hub. The tape is unwound from the inside turn of the loop and wound on the outside turn of the loop.

The device can be easily and instantaneously inserted in a recording/reproducing equipment or in a reproducer designed for this purpose without handling the magnetic tape.

3.39 Cassette — A device composed of a case containing two coplanar or superimposed hubs or reels on which a magnetic tape is wound, so that the tape can move from hub (reel) to hub (reel) during recording, reproduction a fast forward movement or rewinding.

The device can be easily and instantaneously inserted in a recording/reproducing equipment or in a reproducer designed for this purpose, without handling the magnetic tape.

3.40 Endless Loop — A length of tape, the extremities of which are connected together in order to form an endless ribbon.

3.41 Leader (**Trailor**) — A length of ribbon having the same width as the magnetic tape, but without magnetic coating, attached to each extremity of the tape.

In video recording, a length of tape usually preceding the programme material which contains engineering alignment and production information.

3.42 Tape Transport System — A mechanical part driven by one or more motors, the rotation of which determines the tape speed.

3.43 Tape Speed — The speed at which a tape moves past a fixed point.

3.43.1 *Mean Tape Speed* — The average of the tape speed measured at the beginning, the middle and at the end of the full supply reel of largest diameter.

3.44 Capstan — A spindle or a shaft, often a motor shaft itself which drives the magnetic tape during the recording or reproducing action.

3.45 Pressure Roller (**Pinch Roller**) — An idler roller which holds the magnetic tape against the capstan.

3.46 Tape Tension — The force exerted in the longitudinal direction on the tape, either when starting, moving or stopping by the various mechanical components of the transport system.

3.47 Start Time — The elapsed time between operation of the starting device and attaining the specified tape speed within the specified speed fluctuation limits, expressed in seconds.

3.48 Stop Time — The elapsed time between operating the stop device and the time when the tape actually stops expressed in seconds.

3.49 Spooling Time — The time taken for a full largest diameter reel of a specified tape to be spooled at maximum speed.

3.50 Tape Guide — A roller or pillar used to position correctly the magnetic tape along its path on the tape transport system.

3.51 Demagnetizer — A device for reducing magnetization of various components such as magnetic heads, spindles, roller, etc.

3.52 Bulk Eraser — A device for the erasure of the whole recording at the same time.

3.53 Ideal Magnetic Medium — A magnetic medium, the losses of which are negligible.

3.54 Ideal Reproducing Head — A reproducing head, the losses of which are negligible.

3.55 Efficiency Loss in Magnetic Recording — A value, generally expressed in decibels, of the ratio of an output quantity of a magnetic recorder or reproducer, to the same quantity theoretically computed, assuming that no losses occur.

NOTE — Losses arc mainly considered with respect to frequency recorded wave length, etc.

3.56 Azimuth Adjustment — The adjustment of the magnetic recording and reproducing head gaps to a given angle with respect to the direction of the movement of the tape.

NOTE — In audio recording, this angle is generally a right angle.

3.57 Azimuth Loss — A loss due to a misadjustment to the azimuth angle of the reproducing head with respect to the azimuth angle of the recording head.

3.58 Head Adjustment — An operation which consists of setting magnetic heads in a suitable position with respect to azimuth angles and desired track configuration.

3.58.1 *Lateral Alignment* — The adjustment of the magnetic gap parallel to the plane of the magnetic medium and normal to its direction of motion.

3.58.2 *Pole Face Alignment* — The rotation of the contact surface in a plane at right angles to the direction of motion of the magnetic medium in order to effect satisfactory contact over the full length of the gap.

3.59 Calibration Tape — A magnetic tape on which signals have been recorded, corresponding to a specified characteristic, used to calibrate a reproducing chain.

NOTE — A different calibration tape is required for each tape speed.

3.60 Reference Tape — An unrecorded magnetic tape with specified characteristics, selected as a reference, to enable a comparison to be made with other magnetic tapes or to measure characteristics of magnetic recorders.

3.61 Reference Edge — The edge of the magnetic tape used as a datum for the specification of recorded track positions.

It is considered as the guided edge of the magnetic tape on video tape recorders.

3.62 Cupping (**Transverse Curl**) — The curvature of the tape surface perpendicular to and symmetrical about the centre line of the tape.

3.63 Tape Curvature — The amount by which the edge of the magnetic tape departs from a straight line when the tape is lying in a plane under zero tension.

3.64 Cinching — A non-uniform winding of the magnetic tape on a spool which may be caused, for example, by a longitudinal layer to layer slippage.

3.65 Drop-Out — A serious momentary reduction of the reproduced signal level.

3.66 Oxide Shedding — The deterioration of a tape by disintegration of its magnetic coating.

3.67 Tape Editing — An operation enabling a continuous programme to be obtained from several parts.

3.68 Electronic Editing — A method wherein editing is carried out by recording without physically cutting the tape while maintaining the continuity of all tracks.

3.69 Manual Editing — A method wherein editing is carried out by physically cutting and splicing the video tape, the position of the cut being identified by an edit pulse.

NOTE — This method is contrary to USA practice, where the term 'manual editing' describes an operation through which an operator causes the edits to be made in real time (without physical cutting or splicing of the tape) by use of an electronic editor in a manual mode.

3.70 Splice — A butt-joint in a magnetic tape held by means of a strip of adhesive material.

3.71 Steady State Tape Tension — The tension of the tape, when it is travelling at uniform speed.

3.72 Maximum Start Time to Record/Reproduce Speed — The maximum time that has elapsed between the operation of the starting device and the tape speed being increased from zero to a reproduce speed that gives a wow flutter reading which is twice the steady state value.

3.73 Maximum Stopping Time from Record/Reproduce Speed — The maximum time that has elapsed between the operation of the stopping device and the tape speed being reduced to zero.

3.74 Maximum Stopping Time from Maximum Spooling Speed — The maximum time that has elapsed between the operation of the stopping device and the tape speed being reduced from maximum spooling speed to zero.

3.75 Maximum Fast Spooling Time — The time taken for a full maximum diameter reel of a specified tape to be spooled, at maximum speed, on to an empty reel.

3.76 Signal-to-Erased Signal Ratio After Bulk Erasure — The ratio, expressed in decibels, of the reference output level to the specified weighted noise output level after bulk erasure (without machine erase and bias).

NOTE — The frequency weighting employed should always be specified, but if no weighting is stated, the ‘A’ frequency weighting should be understood.

3.77 Signal-to-Bias Noise Ratio — The ratio, expressed in decibels, of the reference output level, to the specified weighted noise output level after erasure with reference bias applied.

NOTE — The frequency weighting employed should always be specified, but if no weighting is stated, the ‘A’ frequency weighting should be understood.

3.78 Output Level Instability — Variations in output level due to inconsistent tape quality and/or head to tape contact.

NOTE — Instability is specified as long term or short term.

3.79 Long Term Instability — The variations lasting for more than one second, and expressed in decibels as the ratio of the highest to the lowest output levels measured over the entire length of the reel of tape.

3.80 Short Term Instability — The variations of a duration between 40 ms and 1 s, expressed as the ratio in dB of the highest to the lowest output levels measured over a length of tape not less than 250 m.

3.81 Erasability — The ratio, expressed in decibels, of the maximum output level at a specified frequency, with reference bias applied, to the residual output level at that frequency, after erasure in a specified field at a specified temperature.

4. MAGNETIC RECORDING. AND REPRODUCTION: AUDIO

4.1 Magnetic Sound Recording System — A system for the conversion of electrical signals generally of acoustic origin, into variations of the remanent magnetization of recording medium.

4.2 Magnetic Sound Reproducing System — A system for the conversion of the variations of the remanent magnetization of a recording medium into electric signals by means of a reproducing head. These signals are, in a general manner reproduced in the form of acoustic signals by means of a suitable transducer.

4.3 Tape Recorder — A magnetic recording/reproducing apparatus in which the recording medium is in the form of a magnetic tape.

4.4 Full Track Recording — A recording process in which a single track occupies substantially the whole width of the magnetic tape.

4.5 Multitrack Recording — A recording process in which several longitudinal and parallel tracks are recorded on the same tape.

NOTE — In monophonic recording, the tracks may be successively recorded in alternate directions; in stereophonic recording, the tracks may be successively recorded in pairs not necessarily adjacent, in alternate opposite directions.

For an endless loop contained in a cartridge, all single tracks (monophonic recording) or pairs of tracks (stereophonic recording) are recorded in the same direction.

4.6 Multitrack Recording System — A system which provides on a medium such as a magnetic tape, two or more recording paths, parallel to each other and which may carry either related or unrelated programme material.

4.7 Longitudinal Magnetization — A recording in which the principal component of the recorded magnetic field is parallel to the direction of the relative head to tape movement.

4.8 Perpendicular Magnetization — A recording in which the principal component of the recorded magnetic field is perpendicular to the plane of the tape.

4.9 Transverse Magnetization — A recording in which the principal component of the recorded magnetic field is parallel to the plane of the tape and perpendicular to the direction of the relative head-to-tape movement.

4.10 Synchronous Recording — A recording process in which several related signals separately recorded may be simultaneously reproduced without phase shift.

4.11 Recording Audio-Frequency Current — An audio-frequency alternating current passing through the coils of a recording head, generating a magnetic field related to the signal to be recorded on a magnetic medium.

4.12 Tape Deck — An equipment consisting of the tape transport system, the magnetic heads and the associated controls.

4.13 Recording Level Indicator — A device indicating signal level when recording.

4.14 Standard Replay Chain — A replay chain having the same response as that equipped with an ideal reproducing head, the open circuit voltage of which is applied to an amplifier having a specified response curve.

4.15 Magnetic Medium Relative Efficiency (With Respect to a Reference Magnetic Medium) — The difference, expressed in decibels, between two levels of the same signal, recorded, one on a stated magnetic medium and the other on a reference magnetic medium, by the same audio-frequency current; the biasing current has in each case an adequate value.

4.16 Recording Head — A transducer whereby the state or configuration of the recording medium is changed in conformity with the signal.

4.17 Reproducing Head — A transducer whereby the signal is reproduced from a recording.

4.18 Recording Head Relative Efficiency — The difference, expressed in decibels, between two levels of the same signal recorded on the same magnetic tape, one by a stated recording head and the other by a reference recording head, when these heads are energized by the same audio-frequency current; the biasing current has in each case an adequate value.

4.19 Reproducing Head Absolute Efficiency — The electromotive force delivered by a given reproducing head when reproducing a standard level reference magnetic tape.

4.20 Erasing Attenuation — The difference, expressed in decibels, between the level of a signal recorded on a tape, and the remaining level of that signal on the same tape after erasure.

4.21 Line-Up Tape — A calibration (test) tape on which signals have been recorded at a specified level and at the reference frequency.

NOTE — It provides a reference for the adjustment of the gain of the reproducing chain.

4.22 Frequency Tape — A calibration (test) tape on which signals have been recorded at fixed or gliding frequencies under specified conditions.

4.23 Reproducing Electrical Amplitude/Frequency Response — A curve representing the variations of the level, expressed in decibels, at the output of a tape recorder when reproducing a frequency magnetic tape under specified conditions.

4.24 Recording/Reproducing Overall Amplitude/Frequency Response — A curve representing the variations, with respect to frequency, of the level at the output of a tape recorder when reproducing a tape on which a constant level signal applied to the input of the apparatus has been recorded.

4.25 Recording/Reproducing Electro-Acoustical Frequency Response — A curve representing the variations, with respect to frequency, of the sound pressure delivered by a loudspeaker connected to the tape recorder when reproducing a tape on which a constant level signal applied to the input of the apparatus has been recorded.

4.26 Signal to Noise Ratio of a Tape Recorder — The ratio, expressed in decibels, of a wanted signal voltage to the noise voltage at the output of a tape recorder.

NOTE 1 — The signal output voltage is expressed with respect to a given amount of harmonic distortion, obtained by recording a specified frequency signal on a specified recording medium.

NOTE 2 — The noise voltage is measured weighted or unweighted in the absence of a wanted signal.

4.27 Recording/Reproducing Harmonic Distortion — The harmonic distortion of an output signal obtained under stated conditions when reproducing a tape recorder under specified conditions.

4.28 Contour Effect — The alteration of the reproducing electrical amplitude/frequency response curve at long recorded wavelengths due to the shape of the reproducing head, the wrap angle of the tape around the head and the presence of magnetic shields close to the tape.

4.29 Print-Through Effect — An undesired transfer of a recorded signal from one section to another of a recording medium when these sections are brought into contact when wound on a hub or a spool.

4.30 Print-Through Level — The ratio, generally expressed in decibels, of the voltage generated by a spurious signal due to a print-through effect which appears during reproduction of a recorded signal on a magnetic tape, to the voltage energized by the signal generating the print-through.

4.31 Rated Recording Level — The level of a signal, having a frequency equal to the reference frequency which, when applied to the recording head terminals, results in a signal recorded on the tape with a specified value of total harmonic distortion.

4.32 Azimuth Deviation — The deflection of the centre line of the recording/reproducing head gap(s) with respect to a line perpendicular to the edge of a reference tape in the plane of the tape. Azimuth deviation is expressed in minutes of arc, positive if the deviation is in a clockwise direction as seen on the non-coated side of the tape and negative if the deviation is in anticlockwise direction.

4.33 Reverse Relative Tape Efficiency — The difference, expressed in decibels, at a specified frequency, between the relative efficiency of a given tape obtained during the normal direction of travel and its relative efficiency obtained during the reverse direction of travel.

4.34 Record Preserving Sensor Hole — A hole in the back of the cassette, the presence of which may be sensed by the recorder, thus preventing unintentional erasing of a recording.

4.35 Recorded Adjustment Sensor Hole — An additional hole in the back of the cassette, the presence of which may be sensed by a recorder, thus enabling the recorder to adjust bias and/or time constants in accordance with the tape used.

4.36 Break Out Lug — A lug in the record preserving sensor hole which, when broken out after recording, will activate the function of the hole.

4.37 Reproduce Channel Unbalance — The difference, expressed in decibels, of the output levels of two or more channels when reproducing a signal of frequency identical to that obtained from the ‘level’ section of the specified calibration tape.

4.38 Overall Channel Unbalance — The difference, expressed in decibels, of the output levels of two or more channels when recording and reproducing a signal of frequency identical to that obtained from the ‘level’ section of the specified calibration tape.

4.39 Mean Phase Difference Between Related Information — The phase difference between two channels of related information (for example, stereo) resulting from incorrect head-gap alignment with respect to a specified calibration tape.

4.40 Peak-to-Peak Phase Difference Between Related Information — Phase instability between two channels intended to transmit related information, as in stereophony, produced by variation in the direction of tape movement passing the magnetic head gap.

4.41 Third Harmonic Distortion — A non-linear amplitude response resulting from the magnetic characteristics of the recording medium.

4.42 Maximum Output Level — The relative recorded level corresponding to the harmonic distortion level fixed for the kind of tape concerned. The measurement is carried out at a reference frequency which is the frequency of the signal recorded in the ‘level’ section of the corresponding standard calibration tape.

4.43 Minimum Source EMF (Recording) — The source emf, which, when recorded on the specified reference tape at maximum record gain, will result in a tape flux which is identical to that of the rated recording level.

4.44 Maximum Source EMF (Recording) — The source emf, which results in twice the total harmonic distortion obtained when the record gain is set at maximum and the tape flux is 6 dB below the rated recording level.

4.45 Maximum Recording Audiofrequency Current — The audio-frequency recording current necessary to obtain maximum output level from the specified reference tape at reference bias.

5. MAGNETIC RECORDING AND REPRODUCTION: VIDEO

5.1 Video Tape Recorder — An equipment for recording and reproducing video and audio signals on magnetic tape.

5.2 Video Tape Reproducer — An equipment for reproducing video and audio signals on magnetic tape.

5.3 Longitudinal Video Tape Recorder — A video tape recorder wherein one or several tracks parallel to the edges of the magnetic tape are traced by the video head(s).

5.4 Transverse Video Tape Recorder — A video tape recorder wherein one or several tracks approximately perpendicular to the edges of the magnetic tape are traced by the video head(s).

5.5 Helical Video Tape Recorder — A video tape recorder wherein the tape follows a helical path, resulting in the video tracks being oblique with respect to the edges of the magnetic tape.

5.6 Video Head Assembly — The unit on a transverse video tape recorder/reproducer comprising in particular a head wheel, magnetic heads and associated components such as: motor, vacuum guide, tachometer, rotary transformer or slip-rings, control track head, etc.

5.7 Head Wheel — The rotary cylindrical part of a video head assembly carrying on its periphery the magnetic head(s) used for video signal recording and reproduction.

5.8 Pole Tips — Those parts of the magnetic circuit of the video heads which protrude from the head wheel and make contact with the tape; each head has two pole pieces separated by the gap.

5.9 Vacuum Guide — That part of the video head assembly used to maintain the tape in the correct position relative to the head wheel by means of a suction system.

5.10 Tip Engagement — The distance by which the tape is moved by the head pole pieces with respect to the position which it is given by the vacuum guide.

5.11 Tip Projection — The difference between the radius of the circle described by the extremities of the pole tips and the radius of the head wheel.

5.12 Video Record Current — An alternating current flowing through the windings of a recording head and generating a magnetic field, the frequency of which is a function of the value of the video signal to be recorded on the magnetic medium.

5.13 Video Track — The track containing the video signal information.

5.14 Audio Track — The track containing the audio signal information.

5.15 Control Track — The track containing the recorded servo-control signals of the video tape recorder; it also contains the edit pulses.

5.16 Cue Track — The track containing information relating to production requirements, electronic editing, or possibly a second programme audio signal.

5.17 Downstream — Pertaining to locations on the tape longitudinally displaced from a given reference point in the direction of tape motion.

5.18 Upstream — Pertaining to locations on the tape longitudinally displaced from a given reference point in the opposite direction to tape motion.

5.19 'Low Band' Standards — The operating procedure of a transverse video tape recorder causing the following instantaneous frequencies to correspond to the various levels of the video signals:

	625 lines *50 HZ*	*525 lines* *60 HZ*
Peak white	6.80 MHz	6.80 MHz
Blanking	5.50 MHz	5.00 MHz
Tip of synchronous pulse	4.95 MHz	4.28 MHz

5.20 'High Band' Standards — The operating procedure of a transverse video tape recorder causing the following instantaneous frequencies to correspond to various levels of the video signals:

	625 lines *50 HZ*	*525 lines* *60 HZ*
Peak white	9.30 MHz	10 MHz
Blanking	7.80 MHz	7.90 MHz
Tip of synchronous pulse	7.16 MHz	7.06 MHz

5.21 Head Clogging — The accumulation of particles from the tape on the front surface of the heads especially in the vicinity of the gaps.

5.22 Banding — A visible defect in a portion of a reproduced picture associated with a particular head.

5.23 Velocity Error — The deviation within a specified period of the rate of reproduction of a video signal with respect to its rated value.

5.24 Jitter — A perceptible instability of the time base of a reproduced video signal.

5.25 Moire — An interference pattern in the reproduced picture due to unwanted modulation products.

5.26 Geometric Error — Time base errors resulting in geometric errors in the reproduced picture of a video tape recorder.

5.27 Master Original — Recording of original signals.

5.28 Master Copy — In the assembly of a recorded programme by editing techniques, the first tape produced which contains all the intended scene durations and sequences.

5.29 Edit Pulses (**Frame Pulses**) — A series of pulses recorded on the video tape control track to assist in the location of the correct editing point and to provide synchronization information to the servomechanism during the start-up period of the reproduce mode.

6. OPTICAL RECORDING

6.1 Photographic Sound Recorder (**Optical Sound Recorder**) — An equipment incorporating means for producing a modulated light beam and means for moving a light-sensitive medium relative to the beam for recording signals derived from sound signals.

6.1.1 Galvanometer Recorder — A combination of mirror and coil suspended in a magnetic field. The application of a signal voltage to the coil causes a reflected light beam from the mirror to pass across a slit in front of a moving photographic film, thus providing a photographic record of the signal.

6.2 Sound Track — A narrow band usually along the margin of a sound film which carries the sound record.

NOTE — This term can be applied to magnetic as well as to optical recording.

6.3 Light Modulator — The combination of a source of light, an appropriate optical system, and a means of varying the resulting light beam (such as galvanometer or light valve), so that a sound track may be produced.

6.3.1 *Aeolight* — A glow lamp employing a cold cathode and a mixture of permanent gases in which the intensity of illumination varies with the applied signal voltage.

6.3.2 *Light Valve* — A device whose light transmission can be made to vary in accordance with an externally applied electrical quantity, such as voltage, current, electric field, magnetic field or electron beam.

6.4 Variable Area Track — The sound track divided longitudinally into transparent and opaque areas, by one or more sharp lines of demarcation which form an oscillographic trace of the wave shape of the recorded signal.

6.5 Unilateral Area Track — A sound track in which one edge only of the opaque area is modulated in accordance with the recorded signal. There may, however, be a second edge modulated by a noise-reduction device.

6.6 Bilateral Area Track — The variable area track having the two edges of the central area modulated according to the signals.

6.7 Variable Density Track — The sound track whose density varies in accordance with the recorded signal while remaining constant over the whole width of the track.

6.8 Multiple Sound Track — The sound track divided into two or more partial or separate tracks.

6.9 Push-Pull Recording Track — The system in which the signal is recorded in two adjacent sound tracks with a phase-difference of 180.

6.10 Class A Push-Pull Sound Track — This consists of two single tracks side by side, the transmission of one being 180 degrees out of phase with the transmission of the other. Both positive and negative halves of the sound wave are linearly recorded on each of the two tracks.

6.11 Class B Push-Pull Sound Track — This consists of two tracks, side by side, one of which carries the positive half of the signal only, and the other the negative half. During the inoperative half cycle, each track transmits little or no light.

6.12 Squeeze Track — A variable density sound track wherein, by means of adjustable masking of the recording light beam and simultaneous increase of the electrical signal applied to the light modulator, a track having variable width with greater signal-to-noise ratio is obtained.

6.13 Single Track — A variable density or variable-area sound track in which both positive and negative halves of the signal are linearly recorded.

6.14 Optical Sound Reproducer — The combination of a light source, an appropriate optical system and a mechanical system for moving a film relative to light beam, whose purpose is to convert signals in a sound track into electrical signals.

6.15 Sound Head — A reproducing head for photographically recorded sound.

6.16 Sound Film — A combined picture film and sound track.

6.17 Sound Track Film — A film with optical sound track but without a picture.

6.18 Optical Slit Alignment — The adjustment of the optical slit or its image in relation to the recording medium.

6.18.1 *Azimuth Alignment* — The orientation of the slit or its image in relation to the direction of motion of the recording medium.

6.18.2 *Track Placement* — The lateral adjustment of the slit or its image parallel to the plane of the recording medium and normal to its direction of motion.

6.19 Recording Slit Loss — The progressive loss of recorded level with increasing frequency due to the finite dimension of the slit or its image, in the direction of travel of the medium.

6.20 Scanning Loss — The progressive loss of reproduced level with increasing frequency due to the finite dimension of the scanning slit or its image, in the direction of travel of the medium.

6.21 Printer Loss — A degradation due to imperfections in the printing process.

6.22 Scoring System — A recording system used for recording music to be reproduced in timed relationship with a motion picture.

6.23 Noise Reduction — In photographic recording and reproducing, it is a process whereby the average transmission of the sound track of the print (averaged across the track) is decreased for signals of low level and increase for signals of high level.

NOTE — Since the background noise introduced by the sound track is less a low transmission, this process reduces film noise during soft passages. The effect is normally accomplished automatically.

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NOTE — This index has been prepared in accordance with IS : 1275-1958*. Index numbers are clause numbers.

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